

# Working Paper

---

UNIT LEADERS' EVALUATION OF MISSION SUPPORTABILITY BY  
THE SINGLE CHANNEL GROUND AND AIRBORNE RADIO SYSTEM  
(SINCGARS)

Reproduced From  
Best Available Copy

**DISTRIBUTION STATEMENT A**  
Approved for Public Release  
Distribution Unlimited

Louis W. Buckalew  
Fort Hood Field Unit

June 1988



**U.S. Army Research Institute  
for the Behavioral and Social Sciences**  
5001 Eisenhower Avenue, Alexandria VA 22333

---

This working paper is an unofficial document intended for limited distribution to obtain comments. The views, opinions, and/or findings contained in this document are those of the author(s) and should not be construed as the official position of ARI or as an official Department of the Army position, policy, or decision, unless so designated by other official documentation.

20011018 078

# UNIT LEADERS' EVALUATION OF MISSION SUPPORTABILITY BY SINCGARS

## CONTENTS

---

	Page
Background . . . . .	1
Participant Description. . . . .	1
Evaluation Methodology . . . . .	1
Findings . . . . .	1
Conclusions. . . . .	5

## LIST OF TABLES

---

	Page
Table 1 - Unit Leader Assessment of SINCGARS Mission Support . . .	2
Table 2 - Unit Leader Assessment of SINCGARS RAM and Interoperability . . . . .	5
Table 3 - Unit Leader Assessment of SINCGARS Communication Quality. . . . .	3
Table 4 - Unit Leader Perceptions of SINCGARS Training Requirements . . . . .	4
Table 5 - Unit Leader Assessment of SINCGARS Operator Problems . .	5

## UNIT LEADERS' EVALUATION OF MISSION SUPPORTABILITY BY SINCGARS

### BACKGROUND

An issue of concern to Army decision-makers was the ability of the Single Channel Ground and Airborne Radio System (SINCGARS) to support a unit's mission. This issue involved the assessment by unit leaders of the impact of SINCGARS on the unit and its mission. The concept of unit mission support, for evaluation purposes, was considered as impacted upon by considerations of: reliability, maintainability, quality of communications, training requirements, interoperability, and confidence in equipment, as well as direct mission support. The evaluation of the unit mission supportability issue was requested of the Army Research Institute as part of their overall MANPRINT assessment.

### PARTICIPANT DESCRIPTION

The target audience of this data collection and evaluation effort was unit leadership. For the purpose of this evaluation, "unit leadership" was operationally defined as "officers" (platoon leaders through battalion commanders) and "senior NCOs" (platoon sergeants and above). Two units participated: a mechanized infantry battalion (-) and a field artillery battalion (-). The infantry unit leaders participating included: 1 LTC, 1 MAJ, 3 1LTs, 1 2LT, 1 CSM, 5 MSG/1SGs, 3 SFCs, and 1 SGT. Participating leaders from the artillery unit included: 1 MAJ, 1 CPT, 2 1LTs, 2 2LTs, 1 MSG, 1 SFC, and 5 SSGs. All leaders had participated in the SINCGARS Follow-on Test and Evaluation.

### EVALUATION METHODOLOGY

A single method of data collection was employed to address the unit supportability issue: questionnaire. This instrument was designed to both require specific information and to allow contribution of additional or voluntary information. The instrument is described below.

**Questionnaire.** The Unit Supportability Leadership Debrief (ARI Form 2), with 21 items, was administered at the end of the FOTE to units' leadership. Respondents were allowed to complete the questionnaire individually and at their leisure. The instrument contained structured response items (rating scales), fill-in items (problems, tasks, numbers), and unstructured items (open-ended questions, lessons learned). The basic content covered on ARI Form 2 included: unit mission, support of mission and any degradations, problems encountered, communication quality and resistance to jamming, reliability and maintainability of radio, improvements needed, training requirements, interoperability, confidence in equipment, recommendation for fielding, and lessons learned.

### FINDINGS

To put the reported data in the correct perspective, it must be understood that the respondent group (unit leaders) typically had not received

the full SINCGARS operator training program (4+ days) and may or may not have actually operated a SINCGARS radio. As unit leaders, these personnel occupied supervisory, as opposed to operator, positions and their perspective was typically on overall operations of a platoon or higher echelon.

Table 1 reports responses to general and specific items on the ability of SINCGARS to support a unit's mission. Table 2 indicates responses to items concerning reliability, maintainability, and interoperability, to include identification of equipment perceived as problematic. Table 3 reflects evaluations of specific concerns with the quality of transmissions and the radio's ability to facilitate communications during jamming.

Table 1

Unit Leader Assessment of SINCGARS Mission Support

Item	Response	Unit		
		Artillery	Infantry	Combined
How well SINCGARS supported your mission	Extremely well	46%	44%	45%
	Very well	23%	13%	17%
	Generally well	15%	31%	24%
	Borderline	15%	13%	14%
	Generally poor	-0-	-0-	-0-
	Very poor	-0-	-0-	-0-
	Extremely poor	-0-	-0-	-0-
Confidence in ability of SINCGARS to support unit mission	Extremely confident	31%	50%	41%
	Definitely high confidence	31%	-0-	14%
	Generally high confidence	15%	31%	24%
	Borderline confidence	15%	13%	14%
	Generally low confidence	8%	6%	7%
	Definitely low confidence	-0-	-0-	-0-
	Extremely low confidence	-0-	-0-	-0-
Recommendation to another unit on accepting SINCGARS as their commo system	Strongly recommend	46%	44%	45%
	Recommend	15%	25%	21%
	Recommend with reservation	38%	19%	28%
	Undecided	-0-	-0-	-0-
	Recommend rejection with reservation	-0-	13%	7%
	Recommend rejection	-0-	-0-	-0-
	Strongly recommend rejection	-0-	-0-	-0-
Unit mission tasks or operations degraded (part or not capable) by SINCGARS	Yes*	62%	21%	41%
	No	38%	79%	59%

\* Tasks or operations cited: fire planning and execution; general commo; digital commo and authentication; TACFIRE interface; manpack operations.

Table 2

## Unit Leader Assessment of SINCGARS RAM and Interoperability

Item	Response	Unit		
		Artillery	Infantry	Combined
Reliability of SINCGARS	Extremely good	31%	31%	31%
	Very good	31%	25%	28%
	Good	15%	31%	24%
	Borderline	23%	6%	14%
	Poor	-0-	6%	3%
	Very poor	-0-	-0-	-0-
	Extremely poor	-0-	-0-	-0-
Maintainability of SINCGARS	Extremely good	54%	47%	50%
	Very good	31%	20%	25%
	Good	15%	7%	11%
	Borderline	-0-	13%	7%
	Poor	-0-	13%	7%
	Very poor	-0-	-0-	-0-
	Extremely poor	-0-	-0-	-0-
Equipment with which SINCGARS had an interoperability problem?	Yes*	83%	43%	62%
	No	17%	57%	38%

\* Equipment cited: KG-31 (N = 7); TACFIRE (N = 6); DMD (N = 4); mortar computer (N = 2); VFMED (N = 2); BCS (N = 1).

Table 3

## Unit Leader Assessment of SINCGARS Communication Quality

Item	Response	Unit		
		Artillery	Infantry	Combined
Clarity/quality of SINCGARS voice transmissions	Extremely good	23%	50%	38%
	Very good	38%	25%	31%
	Good	38%	25%	31%
	Borderline	-0-	-0-	-0-
	Poor	-0-	-0-	-0-
	Very poor	-0-	-0-	-0-
	Extremely poor	-0-	-0-	-0-
Ability of SINCGARS to support/maintain communications during jamming	Extremely good	15%	27%	21%
	Very good	46%	13%	26%
	Good	31%	27%	29%
	Borderline	-0-	13%	7%
	Poor	-0-	13%	7%
	Very poor	-0-	-0-	-0-
	Extremely poor	8%	7%	7%

Table 4 provides information from unit leadership on training-related concerns with SINCGARS, to include perceptions of initial and "refresher" (sustainment), operator training requirements and operator procedural tasks perceived as difficult. A greatly expanded treatment of SINCGARS operator training conduct and evaluation is included in the SINCGARS FOTE Test Report within the training issue.

Table 4

Unit Leader Perceptions of SINCGARS Training Requirements

Item	Response	Unit		
		Artillery	Infantry	Combined
Based on field experiences following 1 week of operator instruction, rate training	Much too long	8%	6%	7%
	Generally too long	38%	31%	34%
	About right length	38%	44%	41%
	Generally too short	15%	13%	14%
	Much too short	-0-	6%	3%
Hours of training needed for adequate operator preparation	0 to 20	46%	7%	25%
	21 to 40	31%	67%	50%
	41 to 60	8%	7%	7%
	61 to 80	15%	20%	11%
	Mean	33.6	44.6	38.8
How often, in months, operators should get "refresher" training	0-3	60%	47%	52%
	4-6	30%	47%	40%
	7-9	-0-	-0-	-0-
	10-12	10%	7%	8%
	Mean	4.6	4.6	4.6
Operator tasks perceived as difficult to learn or accomplish (frequency of mention)	Net initialization	45%	67%	57%
	ERF procedures	27%	50%	39%
	NCS procedures	27%	25%	26%
	Load/synch time	18%	33%	26%
	Troubleshooting	27%	8%	17%
	Retrans	36%	-0-	17%
	Install/configure RT	18%	17%	17%
	Late entry	9%	17%	13%

Table 5 reports on unit leader's validations, based on their experience and observation, of commonly reported operator problems and concerns or reservations with being totally dependent upon SINCGARS for communications. It is reiterated that some of these leaders had no formal training in SINCGARS operation and may not have actually used the radio during the FOTE.

Table 5

## Unit Leader Assessment of SINCGARS Operator Problems

Item	Response	Unit		
		Artillery	Infantry	Combined
Validity of operator-reported problems of: (mean rating)	5 = Highly valid 4 = Generally valid 3 = Borderline valid 2 = Generally invalid 1 = Highly invalid			
Cabling difficult or comes loose		3.3	4.3	3.8
VINSON cabling problem		4.1	4.3	4.2
Keypad needs illumination		3.3	3.9	3.6
Display hard to see from angle		3.8	3.9	3.9
M151 RT configuration hard to use		2.7	3.3	3.0
Backpack configuration poor		3.7	4.0	3.9
Time drift on clocks		4.3	3.9	4.1
Panel controls need illumination		3.4	4.0	3.6
Volume is too low		3.5	2.8	3.1
Backpack battery life poor		4.2	3.7	3.9
Concerns if unit was totally dependent on SINCGARS for commo (frequency of mention)				
Availability of repair parts and maintenance support		50%	33%	41%
Adequate initial and sustainment training		33%	33%	33%
Battery cost and life		8%	40%	26%
Equipment life and durability		-0-	20%	11%
Interface with KY-57, KG-31, DMD, TACFIRE		25%	7%	15%
Interface with non-SINCGARS or other units		25%	13%	19%
Complexity of operation		-0-	13%	7%

## CONCLUSIONS

Unit leadership's assessment of SINCGARS capability to support a unit's mission was approached and presented as one of multifaceted but interrelated dimensions. As indicated by Tables 1 through 5, a wide range of content was explored with the Unit Supportability Leadership Debrief instrument. Responses, in the form of ratings, time estimates, and directed listings, were

provided by 29 unit leaders and were presented dichotomized by unit type. It was assumed that field artillery and mechanized infantry units may have different perspectives due to different missions and operational requirements made upon SINCGARS. Based on the available data, the following conclusions are suggested:

- o Artillery and infantry units generally had similar and positive ratings of how well SINCGARS supported their missions, confidence in this support, and recommendations of SINCGARS. Approximately 85% of all support ratings were positive.
- o Artillery leaders reported appreciable concern with some aspects of SINCGARS support: 62% indicated that some unit operations were degraded. Only 21% of infantry leaders shared this view. The most frequently mentioned degraded tasks were fire planning and execution, general or overall communications, digital communications, and interfacing with TACFIRE.
- o Units generally had positive ratings of SINCGARS reliability and maintainability, though the infantry tended to rate both, and particularly maintainability, lower than did the artillery. Approximately 85% of all ratings were positive.
- o A large proportion of artillery leaders and half of infantry leaders reported concerns with SINCGARS interoperability or interface with their equipment. Particular interest was placed on problems of interfacing with KG-31s, TACFIRE, and DMDs.
- o The clarity and quality of SINCGARS transmissions were rated positively by artillery and infantry unit leaders.
- o While both artillery and infantry leaders generally rated positively SINCGARS capability to support communications during jamming, infantry unit leaders did express reservations: 33% rated SINCGARS capability as "borderline" or various degrees of "poor".
- o Approximately 40% of all artillery and infantry unit leaders rated operator training time (40 hours) as too lengthy. Artillery unit leaders suggested a larger reduction in hours than did infantry leaders.
- o Artillery and infantry unit leaders were in close accord in suggesting the need for "refresher" or sustainment training for operators every 4 to 5 months. For both groups of unit leaders, operator training (initial and sustainment) was seen as their second greatest concern assuming their dependence on SINCGARS.
- o Unit leaders identified net initialization (cold start, full load) as the most difficult operator task to learn or accomplish. ERF (electronic remote fill) procedures, retransmission, and loading or synchronizing time were also identified as difficult tasks. These perceptions have direct implications for training (initial and

sustainment) and are confirmed by operator reports provided in the ease of operation issue of the SINGARS FOTE Test Report.

- o Unit leaders confirmed the content of commonly reported operator problems recorded in the SINGARS FOTE Test Report: cabling difficulties, difficulty in viewing displays, manpack configuration deficiencies, time drift of clocks, and need for illumination of controls and the keypad.
- o Assuming total dependence upon SINGARS for communications, artillery and infantry unit leaders expressed important and appreciable concerns for the following: availability of repair parts and maintenance support, adequate initial and sustainment training, and battery cost and life. These appear to be legitimate concerns from a leader perspective, and are confirmed by soldier-operator data reported within the training issue and ease of operation issue sections of the SINGARS FOTE Test Report.